his homeland across the Atlantic. Mr. Vail's lifework was the development of the "Bell" telephone system in the United States, and it is to his personal initiative that the enormous growth of the American Telephone and Telegraph Co., of which he was for many years the president, is largely due. He was a rare combination of the business man, quick to see opportunities and far-seeing in his policy, and the patient, scientific worker. It is not too much to say that the success of the American telephone system, culminating in the achievement of speech from New York to San Francisco, is mainly due to the unremitting attention that he gave to the organisation and prosecution of research, and the technical laboratories that he initiated are the finest in any industrial undertaking. It is pleasant to think that, unlike many workers on parallel lines, Mr. Vail lived to behold the fruit of his labours.

The death is announced, at the age of eighty years, of Dr. John A. Brashear, the founder of the well-known American firm of makers of astronomical and physical instruments. In his youth, while working as a machinist, Dr. Brashear devoted himself to the study of astronomy, and made his first telescope while pursuing this hobby after his working hours. With this instrument he made many observations, as a result of which he contributed articles to the daily Press on comets, etc. These attracted the attention of Mr. William Shaw, whose offer to build and equip for him a good shop for the production of astronomical instruments was accepted. This ultimately developed into the works of the John A. Brashear Co. at Pittsburgh, which turns out instruments that are used in observatories all over the world. Dr. Brashear received the honorary doctorate from Pittsburgh and other universities, and from 1901 to 1904 was acting chancellor of the Western University of Pennsylvania, now the University of Pittsburgh. He was a member of many American and foreign scientific societies, and was a recognised authority on solar phenomena, lunar craters, and other subjects.

Mr. James Metcalfe, who died on April 12, was born in 1847, and was locomotive superintendent of the Manchester and Milford Railway from 1867 to 1880. He was afterwards managing director of the Patent Exhaust Steam Injector Co., whose injectors are extensively used in locomotives. Mr. Metcalfe was elected a member of the Institution of Mechanical Engineers in 1906.

The death is announced of Mr. Frank Edward Priest as having taken place on April 14. Mr. Priest was born in 1860, and was chiefly interested in railways, waterworks, and road and sewerage works. He took a great interest in aeronautics, and at the time of his death he was chairman of Messrs. A. V. Roe and Co., Ltd. He was elected a member of the Institution of Civil Engineers in 1896.

Notes.

Further news from Capt. Roald Amundsen fails to explain his movements. According to the *Times* of April 23, a message has been received in Norway from the wireless station on the Anadir to the effect that the expedition will arrive at Nome, Alaska, at the end of July. Nome is the port Amundsen reached on his accomplishment of the North-West Passage in the *Gjoa* in 1905. Possibly his ambitions include the North-West Passage before starting on his North Polar journey. These two difficult journeys, in addition to the discovery of the South Pole and the not improbable attainment of the North Pole, would be a remarkable record for one man. A start on the polar drift from Bering Strait or Point Barrow entails a longer route than Amundsen had originally intended, so that he may be calling at Nome for extra stores. News of the arrival of Amundsen himself at Anadir needs confirmation.

Now that political and social conditions are more favourable in the Near East, a certain recrudescence of archæological activity is evident. The recent discoveries of M. Hatzidakis at Mallia, in Crete, have been followed by a further discovery west of Candia. M. Xanthoudides has excavated a Cretan palace, which appears to date for the most part from the end of the Middle Minoan period to the end of the first Late Minoan period. The most important discovery made in the palace was a series of colossal bronze double-axes, measuring several feet in length in some cases. No such axes of this size have yet been found on Cretan sites, and their purpose is for the present obscure. Another excavation by M. Xanthoudides near Candia brought to light some pottery of Early Minoan date of a peculiar type. Similar pottery has been found only at one other site in Crete, and it does not appear to be typically Cretan. In shape the vases found resemble the so-called Minyan ware. In technique they have no parallel in Cretan wares. The detailed publication of both these excavations will be awaited with the greatest interest.

Applications for grants in aid of scientific investigations bearing on agriculture are receivable by the Ministry of Agriculture and Fisheries not later than May 15. They must be made upon Form A. 230/1, copies of which are obtainable upon application to the General Secretary, Ministry of Agriculture and Fisheries, 72 Victoria Street, S.W.1.

The Minister of Health has appointed a Committee to consider and advise on the legislative and administrative measures to be taken for the effective control of the quality and authenticity of such therapeutic substances offered for sale to the public as cannot be tested adequately by direct chemical means. The members of the Committee are:—Sir Mackenzie Chalmers (chairman), Dr. H. H. Dale, Dr. G. F. McCleary, Mr. A. B. Maclachlan, and Dr. C. J. Martin. The secretary is Dr. E. W. Adams, of the Ministry of Health.

The following have been elected officers and council of the Society of Antiquaries of London: *President:*

Sir C. Hercules Read. *Treasurer:* Mr. W. Minet. *Director:* Sir Edward W. Brabrook. *Secretary:* Mr. C. R. Peers. *Council:* Sir W. Martin Conway, Mr. V. B. Crowther-Beynon, Mr. H. R. H. Hall, Mr. W. J. Hemp, Mr. A. F. Hill, Mr. C. H. Jenkinson, Sir Matthew I. Joyce, Mr. C. L. Kingsford, Lt.-Col. G. B. Croft Lyons, Prof. J. L. Myres, Lord Northbourne, Prof. E. Prior, Mr. J. E. Pritchard, Mr. H. W. Sandars, Major G. T. Harley Thomas, Mr. R. Campbell Thompson, and Mr. W. H. Aymer Vallance.

THREE important scientific appointments will shortly be made by the British Cotton Industry Research Association, and the council of the association invites applications from qualified candidates. The posts to be filled are those of the heads of the departments of colloid chemistry and physics, organic chemistry, and botany. The minimum salary offered in each case is 1000*l.* per annum. Applications, accompanied by the names of two referees, must be received not later than Saturday, May 22. Forms of application and any further information may be obtained from the Director, British Cotton Industry Research Association, 108 Deansgate, Manchester.

INFLUENZA is abating somewhat in its severity, according to the latest weekly returns of the Registrar-General. The deaths from the disease for the week ending April 17 numbered only 306 for the ninety-six great towns of England and Wales, whilst for the three preceding weeks the deaths were 392, 379, and 332. A similar decrease is shown in the deaths for London, which for the week ending April 17 numbered 101, and for the three preceding weeks the deaths were 131, 124, and 105. The returns also show a decrease in the deaths from pneumonia and bronchitis. The age incidence of the present influenza epidemic resembles somewhat the character of the attacks in 1918 and 1919, which were entirely different, so far as age incidence goes, from previous attacks since 1890. There seems, however, now a tendency to revert somewhat to the former age incidence. In the present epidemic the deaths in London during the last twenty-six weeks numbered 1056, and of these 16 per cent. occurred between the ages of 0 and 20, 36 per cent. between 20 and 45, and 48 per cent. at ages above 45 years. In the virulent attacks of 1918 and 1919 the deaths were about 24 per cent. between the ages of 0 and 20, 46 per cent. from 20 to 45, and 30 per cent. above 45 years, the able-bodied being attacked most severely. The maximum number of deaths in any week in London during the present epidemic was 131, whilst in the summer epidemic of 1918 the deaths in one week numbered 287, and in the autumn of 1918 the deaths from influenza for two successive weeks, November 2 and 9, amounted to 2458 and 2433. For the ninety-six great towns the deaths for the same two weeks in November were respectively 7412 and 7557, against 392 in the week ending March 27 in the present epidemic.

IN *Man* for April Sir W. Ridgeway describes two wooden Maori daggers, part of a collection brought home by the late Col. Honner after the first Maori war in 1840–41. It was at first suggested that these implements were Potuki, or "flax-beaters," and it was doubted whether the Maori did use daggers. But Mr. Henry Balfour has described a bone dagger from the Chatham Islands, and some cultural similarities indicate a link between those islands and New Zealand, especially the Otago district. It is now certain that the Maori did use daggers made of wood and bone. As regards the Potuki, there is a class of beautifully carved examples which can never have been put to any practical use. Their exact function has not been recorded, but they were, perhaps, signs of dignity in the tribe. Sir W. Ridgeway remarks that the paper mulberry, from which tapa cloth was made, was brought to New Zealand by Maori immigrants. But it did not thrive, and the tapa-beater, so important in the social life of Polynesia, would thus fall out of practical use. "My suggestion is that it retained only a ceremonial significance, and that its parallel straight grooves conditioned the type of decoration which the Maoris subsequently applied to it."

IN the Journal of the Manchester Egyptian and Oriental Society for 1918–19, recently published, Mr. W. J. Perry discusses the significance of the search for amber in antiquity in connection with the megalithic problem. He supposes that the amber used for decorative purposes in the Mycenæan age may have been found in the Adriatic. It is not easy, however, to see why it should have been so readily adopted as a form of wealth, as it does not possess the attractiveness of gold and pearls. Mr. Perry suggests as an explanation of its value that amber, a solidified resin, may have been associated with the productions of certain trees venerated in Egypt as the source of resinous substances used in mummification and other death-rites. As a further explanation he refers to the Chinese use of jade and gold, supposed to convey vitality to those who consumed them. "In the case of the Chinese, whose civilisation can be accounted for on the hypothesis of a cultural movement across Asia from goldfield to goldfield, the desire for life, health, and immortality has played an important part in the production of philosophical systems, and thus it is possible that their civilisation itself owes its existence to that instinctive process." The theory is certainly ingenious, but the evidence in its support is still scanty, and the analogy of Chinese or Egyptian beliefs with the search for amber in Europe must be accepted with some caution.

THE trade routes of the British Empire in Africa is the subject of a paper by Mr. G. F. Scott Elliott in the Journal of the Royal Society of Arts for April 2 (vol. lxviii., No. 3515). Mr. Scott Elliott approaches the problem of future rail and steamer routes from a geographical point of view. He emphasises the location of the plateau regions in Central Africa, each of which above 5000 ft. is a possible centre for European settlement, civilisation, and trade. The problem as he sees it is to link these interior regions with British seaports by lines through British territory. He discusses at length the possible routes for railways linking Lakes Nyassa, Tanganyika, Victoria, Edward, and Albert. These lines, with the construction of a railway from Kashitu, on the Bulawayo-

Katanga line, would complete a Cape-to-Cairo route within British territory.

THE annual report on the Nile gauges and rainfall of the Nile Valley ceased publication during the war, the last number being that for 1912, published in 1914. The work has now been transferred from the Survey Department to the Ministry of Public Works, which publishes the records of the gauges for 1913 to 1918 as Physical Department Paper No. 1. In order to reduce the number of data, five-day means are given for twenty representative gauges between the delta barrage and Entebbe, on Lake Victoria. Tables are also given of monthly means for each of the six years, and the actual discharges on certain days at several stations on the main Nile and Blue Nile. These discharges were measured by the current meter, which Mr. H. E. Hurst, the author of the report, calculates has a probable error of not more than about 3 per cent.

Two papers published recently by the Ministry of Agriculture and Fisheries (Series II., Sea Fisheries, vol. iv., Nos. 1 and 2) deal with the method of determining the age of fishes by inspection of the scales. It is well known that the material of the latter structures is laid down in more or less regular layers, and that there are differences between the substance deposited in the warmer, and that laid down in the colder, months. By counting these rings, then, an estimate of the age of the fish can be made. The method is not applicable to all scale-bearing fishes, and there has been much discussion as to its trustworthiness. In the first of the papers to which reference is here made Mr. R. E. Savage describes the structure of various scales as elucidated by special reagents and studied under polarised light. In the second paper Miss R. M. Lee has made a critical review of most of the important memoirs dealing with scale-markings, and subjected selected series of measurements to mathematical tests. Her general conclusions are that, with certain precautions, the method is trustworthy.

THE climate and weather of the Falkland Islands and South Georgia is the subject of a memoir compiled by Mr. C. E. P. Brooks, and published by the Meteorological Office as Geophysical Memoir No. 15. The Falkland Islands observations are all from Cape Pembroke lighthouse with the exception of a few discontinuous series from Port Stanley. The Cape Pembroke records date from the visit of the *Scotia* in 1903, when Dr. W. S. Bruce and Mr. R. C. Mossman started observations there in connection with their records in the Weddell Sea. The scanty South Georgia records are the result partly of various scientific expeditions, but are mainly due to the enterprise of the Argentine Fishery Co. in Cumberland Bay. Summaries of all available data, including those previously published, are given in the memoir.

THE Danish Meteorological Institute has published its issue for 1919 on the state of the ice in Arctic seas. As usual, the publication is in both Danish and English, and is well illustrated with charts. Information was scarce from the Beaufort and Bering Seas, Baffin Bay, and the western part of Davis Strait. In Spitsbergen seas the state of ice was about normal; the pack-ice off the west coast in April and May disappeared in June, and did not return throughout the summer. The ice in the fjords did not break up until May, which is later than usual and two months later than this year. The coasts of Iceland were singularly free from ice throughout the year except for a few days on the north-east in spring, and again in summer. Icebergs on the Newfoundland banks were normal in number and distribution. The Kara Sea, as usual, was navigable in the south and east in September, but there is no information for earlier summer months.

THE attention of systematic students of the Arachnida may advantageously be directed to J. Hewitt's "Survey of the Solifugæ of South Africa" (Ann. Transvaal Mus., vol. vii., part 1, 1919), in which clear generic and specific diagnoses are illustrated by structural drawings and by a series of excellently reproduced photographs. E. A. McGregor's paper on the "red spiders" (Tetranychi) of America (Proc. U.S. Nat. Mus., vol. lvi., 1919) is another recent arachnological publication of importance.

A CONTRIBUTION of importance to Cetacean embryology has been made by Dr. F. E. Beddard, who describes (Ann. Durban Mus., vol. ii., part 4, 1919) two embryos of the sperm whale of an earlier stage than has hitherto been observed. The smaller, measuring only 114 mm. in length, has the relatively short head flexed ventralwards, so that its long axis is almost at right angles to that of the body, while the lower jaw projects beyond the upper; the tail-fin is narrow and ovate in form.

IN a memoir on "The Theoretical Determination of the Longitudinal Seiches of Lake Geneva" (Edin. Roy. Soc. Trans., vol. lii., 1920, pp. 629–42), Messrs. Doodson, Carey, and Baldwin have applied Proudman's general solution (Lond. Math. Soc. Proc., vol. xiv., p. 240) to the particular case of Lake Geneva. The dimensions of the lake along thirty-one sections being obtained from Hornlimann and Delebecque's map, the durations of the first three periods were found to be 74·45, 35·1, and 28 minutes. According to Forel's observations (with a slightly different zero-plane), the period of the uninodal oscillation is 73·5 minutes, and of the binodal oscillations 35·5 minutes. The positions of the nodes of the uninodal and binodal oscillations are also determined theoretically, and agree approximately with those found experimentally, although, as the authors remark, the exact determination of nodes by observation is very difficult. Would it not be possible to test the latter by observing the reflections of the setting sun from the east end of the lake? Three definite reflections were once seen from such a position by the writer of this note.

THE Journal of the Queckett Microscopical Club (vol. xiv., November, 1919) contains an interesting contribution by Dr. Hamilton Hartridge on microscopic illumination, in which the question of the supposed advantages of so-called critical illumination (which consists in accurately focussing an image of the actual source of light upon the object under examination) is carefully examined. The well-arranged and conclusive experiments described by the author lead to an unconditionally negative answer which will not surprise those who are familiar with the theory of microscopic image-formation, but the results, being experimental, may put an end to the barren discussions on this subject by practical microscopists. A very neat and compact arrangement for the efficient and perfectly controlled illumination of objects in accordance with the results of the investigation is described. Some of the theoretical views in the first part of the paper are not acceptable. Whilst it is true that the usual methods of illumination do not strictly realise the assumptions underlying Abbe's theory, it is surely not open to question that the *theoretical* work and the rare *theoretical* calculations of images have always been carried out in accordance with the theory. The statement that if the ideals of critical illumination were realised, then resolution would be destroyed, is quite untenable, for as that ideal is to make the object behave as if it were self-luminous, the statement amounts to claiming that a self-luminous object—say a white-hot one—could not give a distinct image, which is absurd.

We have received the fourth report (for 1916) of the seismological observations at De Bilt, Holland (Konink. Nederl. Meteor. Inst., No. 108, 1918, pp. 1–102), in which are given full details of the records obtained from horizontal motion seismographs of Galitzin and Wiechert and a pair of Bosch horizontal pendulums, as well as a summary of the results from other observatories of the more important earthquakes. From this report we learn that the munitions explosion at Faversham on April 2, 1916 (see Nature, vol. xcix., 1917, p. 250), was registered by the Wiechert and Galitzin pendulums at De Bilt. The effects of the air-waves of this explosion were widely manifested in Holland, especially in the western districts, by the shaking of doors, windows, and pictures, as if by a slight earthquake.

One of the strongest earthquakes felt in Porto Rico since the European occupation occurred on October 11, 1918, the official Report of the Earthquake Investigation Commission (Washington, 1919), by Prof. H. F. Reid and Mr. S. Taber, having recently been published. The approximate position of the epicentre is given as 18° 30′ N. lat., 67° 20′ W. long., in the north-east portion of Mona Passage, and the time of occurrence, within a very few seconds, at 2h. 14m. 38s. p.m. (Greenwich mean time). The earthquake was followed after a few minutes by a sea-wave which reached a height of about $4\frac{1}{2}$ metres above mean sea-level along the north-west coast of Porto Rico, the first movement of the water, wherever seen, being one of withdrawal. The epicentre lies along a deep submarine valley, the slopes of which are so steep that they must be regarded as the result of faulting. During the last half-century the north-west coast of the island has been noticeably subsiding, and the authors attribute the earthquake and sea-wave to a vertical displacement near the head or on one side of the submarine valley.

Our Astronomical Column.

Eclipse of the Moon.—There will be a total eclipse of the moon on the night of May 2–3. The following are the Greenwich times of the various stages:—

Moon enters penumbra ...	May 2,	10.49 p.m.
Moon enters shadow	,,	12.0 mid.
Beginning of total eclipse ...	,, 3,	1.15 a.m.
End of total eclipse	,,	2.27
Moon leaves shadow ...	,,	3·41
Moon leaves penumbra ...	,,	4·53

At Greenwich the moon rises on May 2 at 7.5 p.m. and sets on May 3 at 4.34 a.m. The whole of the phases of the eclipse will thus be visible.

During some lunar eclipses the disc of our satellite has remained fairly bright, while at others it has been scarcely visible. If atmospheric conditions are favourable, observations of the character of the shadow on this occasion might be made and, possibly, photographs taken. During the lunar eclipse of July 4, 1917, observations made at the Bordeaux-Floriac Observatory showed that throughout totality the north edge of the moon seemed brighter than the south.

Mars and Wireless Signals.—It is regrettable that in these days, when results of great interest concerning solar and stellar physics are continually being reached, the public should have its attention concentrated upon sensational assertions, such as the Porta planetary scare last December and the suggestion of wireless signals to or from Mars which is now under discussion in the daily Press. Leaving aside the physical difficulties of such communication—which, though considerable, are perhaps not insuperable—a very little consideration suffices to show the utter improbability, closely approaching to impossibility, that the idea of signalling should be mooted simultaneously on the two planets. On any view as to the development of the planetary system, the periods when Mars and the earth pass through corresponding stages would be likely to be separated by millions of years. The suggestion that the Martians have kept up the practice of signalling at every opposition through such a period as this, in the patient hope that they might one day be answered, makes too strong a demand upon our credulity.

The April Meteor Shower.—The weather was moderately fine at the time the Lyrids were expected, and a fair number of them were visible. The best night seems to have been that of April 21, when the sky was generally clear and the maximum abundance occurred near midnight. The phenomenon was observed by Miss A. Grace Cook at Stowmarket, Mr. S. B. Mattey at Plumstead, S.E., Mr. C. P. Adamson at Wimborne, Mr. W. F. Denning at Bristol, and others. The Lyrid meteors formed about one-half of the total number visible on the nights of April 19, 20, and 21, and nearly all of them left streaks. They moved with moderate velocity, being decidedly slower than either the Leonids or the Perseids. As regards brightness they were much above the average, and some fine ones were recorded on the dates mentioned.

The Wasting of Stellar Substance.—This is the title of a paper by Prof. F. W. Very in *Scientia* for April. It will be remembered that Prof. Eddington made the suggestion in the *Observatory* last September that the immense duration of the radiation from the stars might be explained by the annihilation of some of their component atoms through collision, and the consequent liberation of their stores of energy.